

**In the Claims:**

**Claim 1 (currently amended):** A computer implemented method for simulating a system design containing at least two components, said method comprising:

identifying said components:

creating models of said components in a high level general purpose programming language;

creating a set of function calls in ~~a~~said high level general purpose programming language;

combining said models to form a virtual prototype;

linking one of said models with another of said models using said set of function calls;

executing said virtual prototype, wherein said models communicate through a transaction based interconnect ~~using said set of function calls~~ and cycle accurate information is generated, wherein said transaction based interconnect includes said set of function calls.

**Claim 2 (original):** The computer implemented method of claim 1 wherein said creating models of said components step further comprises:

creating a blank component model;

adding a sub-component to said blank component model; and

configuring one or more parameters for said sub-component.

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**Claim 3 (original):** The computer implemented method of claim 2 wherein at least two of said sub-components are added to said blank component model, further comprising:  
linking said sub-components with said set of function calls.

**Claim 4 (original):** The computer implemented method of claim 2 wherein said components are added into a component repository after said components are created.

**Claim 5 (original):** The computer implemented method of claim 1 wherein said set of function calls comprises:

a control interface for communications between the simulation environment and said components; and  
a peer interface for communications between said components.

**Claim 6 (original):** The computer implemented method of claim 5 wherein said peer interface comprises clock functions, access functions, and signal functions.

**Claim 7 (original):** The computer implemented method of claim 1 wherein said combining step further comprises:

loading a component from a component repository;  
identifying sub-components of said component; and  
elaborating said sub-components.

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**Claim 8 (original):** The computer implemented method of claim 7 wherein said elaborating step further comprises:

- instantiating said sub-components;
- configuring said sub-components; and
- linking said sub-components with said set of function calls.

**Claim 9 (original):** The computer implemented method of claim 1 wherein said generating cycle accurate information step further comprises:

- dividing activities in said simulation environment into a first plurality of activities comprising an execute phase and a second plurality of activities comprising an update phase;
- computing said first plurality of activities comprising said execute phase at a clock edge;
- updating at said clock edge a state of said simulation environment; and
- computing said second plurality of activities comprising said update phase at said clock edge.

**Claim 10 (currently amended):** A computer implemented method for simulating a digital system design in a cycle based simulation environment, comprising:

- creating a system design model in a high level general purpose programming language comprising at least two components;

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creating a transaction based interconnect in asaid high level general purpose programming language that is available to said at least two components;

executing said system design model, wherein said at least two components communicate through said transaction based interconnect ~~using a set of function calls, wherein said transaction based interconnect~~ includes a set of function calls; and

maintaining cycle accurate information during the simulation.

**Claim 11 (original):** The computer implemented method of claim 10 wherein said creating a system design model step further comprises:

creating a blank component model;

adding a sub-component to said blank component model; and

configuring one or more parameters for said sub-component.

**Claim 12 (original):** The computer implemented method of claim 11 wherein at least two of said sub-components are added to said blank component model, further comprising:

linking said sub-components with said set of function calls.

**Claim 13 (original):** The computer implemented method of claim 11 wherein said components are added into a component repository after said components are created.

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**Claim 14 (original):** The computer implemented method of claim 12 wherein said set of function calls comprises:

a control interface for communications between said simulation environment and said components; and

a peer interface for communications between said components and between said sub-components.

**Claim 15 (original):** The computer implemented method of claim 14 wherein said peer interface comprises clock functions, access functions, and signal functions.

**Claim 16 (original):** The computer implemented method of claim 10 wherein said maintaining cycle accurate information step further comprises:

dividing simulation activities in said simulation environment into a first plurality of activities comprising an execute phase and a second plurality of activities comprising an update phase;

computing said first plurality of activities comprising said execute phase at a clock edge;

updating at said clock edge a state of said simulation environment; and

computing said second plurality of activities comprising said update phase at said clock edge.

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**Claim 17 (currently amended):** A computer program product embodied on a computer-readable medium, which when executed, causes a processing system to simulate a system design within a cycle based simulation environment, said computer program product comprising:

instructions for identifying at least two components in said system design;

instructions for integrating models of said at least two components, wherein said models are created in a high level general purpose programming language;

instructions for linking said models using a set of function calls created in asaid high level general purpose programming language; and

instructions for executing said system design, wherein said models communicate through a transaction based interconnect using said set of function calls and cycle accurate information is generated, wherein said transaction based interconnect includes said set of function calls.

**Claim 18 (original):** The computer program product of claim 17 wherein said instructions for creating models further comprises:

instructions for creating a blank component model;

instructions for adding at least one sub-component to said blank component model;

instructions for configuring one or more parameters for said sub-component; and

instructions for linking said sub-components using said set of function calls.

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**Claim 19 (original):** The computer program product of claim 18 further comprising instructions for adding said models of said components into a component repository after said models are created.

**Claim 20 (original):** The computer program product of claim 18 wherein said instructions for creating a set of function calls comprise:

instructions for creating a control interface for communications between said simulation environment and said components; and

instructions for creating a peer interface for communications between said components and between said sub-components.

**Claim 21 (original):** The computer program product of claim 20 wherein said instructions for creating a peer interface further comprise:

instructions for creating clock functions;

instructions for creating access functions; and

instructions for creating signal functions.

**Claim 22 (original):** The computer program product of claim 17 wherein said instructions for generating cycle accurate information further comprise:

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instructions for dividing simulation activities in said simulation environment into a first plurality of activities comprising an execute phase and a second plurality of activities comprising an update phase;

instructions for computing said first plurality of activities comprising said execute phase at a clock edge;

instructions for updating at said clock edge a state of said simulation environment; and

instructions for computing said second plurality of activities comprising said update phase at said clock edge.

**Claim 23 (currently amended):** A method for simulating a design containing at least two components, said method comprising:

creating a model representing each of said at least two components, wherein said models comprise a virtual prototype and communicate through a transaction based interconnect ~~using at least one function call~~, wherein said transaction based interconnect includes at least one function call; and

executing said virtual prototype to generate cycle accurate information.

**Claim 24 (original):** The method of claim 23 wherein said creating step comprises creating said model in a high level general purpose programming language.



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**Claim 25 (original):** The method of claim 23 wherein said creating models of said components step further comprises:

- creating a blank component model;
- adding a sub-component to said blank component model; and
- configuring one or more parameters for said sub-component.

**Claim 26 (original):** The method of claim 25 wherein at least two of said sub-components are added to said blank component model, further comprising:

- linking said sub-components with said at least one function call.

**Claim 27 (original):** The method of claim 25 wherein said components are added into a component repository after said components are created.

**Claim 28 (original):** The method of claim 23 wherein said executing step is performed in a cycle based simulation environment, said method further comprising:

- creating a set of function calls in a high level general purpose programming language, wherein said set of function calls comprises:

- a control interface for communications between said cycle based simulation environment and said components; and

- a peer interface for communications between said components.

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**Claim 29 (original):** The method of claim 28 wherein said peer interface comprises clock functions, access functions, and signal functions.

**Claim 30 (original):** The method of claim 23 wherein said virtual prototype is created by steps comprising:

- loading a component from a component repository;
- identifying sub-components of said component; and
- elaborating said sub-components.

**Claim 31 (original):** The method of claim 30 wherein said elaborating step further comprises:

- instantiating said sub-components;
- configuring said sub-components; and
- linking said sub-components with said set of function calls.

**Claim 32 (original):** The method of claim 23 wherein said executing step is performed in a cycle based simulation environment and said generating cycle accurate information step further comprises:

- dividing activities in said cycle based simulation environment into a first plurality of activities comprising an execute phase and a second plurality of activities comprising an update phase;

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computing said first plurality of activities comprising said execute phase at a clock edge;  
updating at said clock edge a state of said simulation environment; and  
computing said second plurality of activities comprising said update phase at said clock edge.

**Claim 33 (currently amended):** A computer program product embodied on a computer-readable medium, which when executed, causes a processing system to simulate a system design containing at least two components, said computer program product comprising:

instructions for integrating a model representing each of said at least two components, wherein said models comprise a virtual prototype and communicate through a transaction based interconnect ~~using a set of function calls~~, wherein said transaction based interconnect includes a set of function calls; and

instructions for executing said virtual prototype to generate cycle accurate information.

**Claim 34 (original):** The computer program product of claim 33 wherein said models are created in a high level general purpose programming language.

**Claim 35 (original):** The computer program product of claim 33 wherein said instructions for executing said virtual prototype to generate cycle accurate information further comprise:

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instructions for dividing simulation activities in said simulation environment into a first plurality of activities comprising an execute phase and a second plurality of activities comprising an update phase;

instructions for computing said first plurality of activities comprising said execute phase at a clock edge;

instructions for updating at said clock edge a state of said simulation environment; and  
instructions for computing said second plurality of activities comprising said update phase at said clock edge.

**Claim 36 (new):** A computer implemented method for simulating a system design containing at least two components, said method comprising:

identifying said components;

creating models of said components in a high level general purpose programming language;

creating a set of function calls in said high level general purpose programming language;

combining said models to form a virtual prototype;

linking one of said models with another of said models using said set of function calls;

executing said virtual prototype, wherein said models communicate through a transaction based interconnect using said set of function calls and cycle accurate

information is generated;

wherein said generating cycle accurate information step further comprises:

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dividing activities in said simulation environment into a first plurality of activities comprising an execute phase and a second plurality of activities comprising an update phase;

computing said first plurality of activities comprising said execute phase at a clock edge;

updating at said clock edge a state of said simulation environment; and

computing said second plurality of activities comprising said update phase at said clock edge.

**Claim 37 (new):** A computer implemented method for simulating a digital system design in a cycle based simulation environment, comprising:

creating a system design model in a high level general purpose programming language comprising at least two components;

creating a transaction based interconnect in a high level general purpose programming language that is available to said at least two components;

executing said system design model, wherein said at least two components communicate through said transaction based interconnect using a set of function calls; and

maintaining cycle accurate information during the simulation;

wherein said maintaining cycle accurate information step further comprises:

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dividing simulation activities in said simulation environment into a first plurality of activities comprising an execute phase and a second plurality of activities comprising an update phase;

computing said first plurality of activities comprising said execute phase at a clock edge;

updating at said clock edge a state of said simulation environment; and

computing said second plurality of activities comprising said update phase at said clock edge.

**Claim 38 (new):** A computer program product embodied on a computer-readable medium, which when executed, causes a processing system to simulate a system design containing at least two components, said computer program product comprising:

instructions for integrating a model representing each of said at least two components, wherein said models comprise a virtual prototype and communicate through a transaction based interconnect using a set of function calls; and

instructions for executing said virtual prototype to generate cycle accurate information;

wherein said instructions for executing said virtual prototype to generate cycle accurate information further comprise:

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instructions for dividing simulation activities in said simulation environment into a first plurality of activities comprising an execute phase and a second plurality of activities comprising an update phase;

instructions for computing said first plurality of activities comprising said execute phase at a clock edge;

instructions for updating at said clock edge a state of said simulation environment;  
and

instructions for computing said second plurality of activities comprising said update phase at said clock edge.